

## 14.0 Rifle, Colorado, Disposal Site

### 14.1 Compliance Summary

The Rifle, Colorado, Disposal Site was inspected on August 9, 2007, and was in good condition. Erosion repair of the interceptor trench continues to perform as designed. Pore water continues to be removed from standpipes in the toe of the cell and sent to the evaporation pond; water level monitoring indicated the action level was not exceeded. Surveys of the standpipes and nine settlement plates continue to indicate that downhill vertical movement is not occurring; slight settlement was reported, as expected. Minor repairs were made to the site perimeter fence. No cause for a follow-up or contingency inspection was identified.

### 14.2 Compliance Requirements

Requirements for the long-term surveillance and maintenance of the Rifle, Colorado, Uranium Mill Tailings Radiation Control Act (UMTRCA) Title I Disposal Site are specified in the *Long-Term Surveillance Plan [LTSP] for the Estes Gulch Disposal Site near Rifle, Colorado* (DOE/AL/62350–235, Rev. 1, U.S. Department of Energy [DOE], Albuquerque Operations Office, November 1997) and in procedures established by DOE to comply with requirements of Title 10 *Code of Federal Regulations* Part 40.27 (10 CFR 40.27). These requirements are listed in Table 14–1.

Table 14–1. License Requirements for the Rifle, Colorado, Disposal Site

Requirement	Long-Term Surveillance Plan	This Report
Annual Inspection and Report	Section 3.0	Section 14.3.1
Follow-up or Contingency Inspections	Section 3.4	Section 14.3.2
Routine Maintenance and Repairs	Section 4.0	Section 14.3.3
Groundwater Monitoring	Section 2.6 and Appendix	Section 14.3.4
Corrective Action	Section 5.0	Section 14.3.5

**Institutional Controls**—Institutional controls at the disposal site, as defined by DOE Policy 454.1, consist of federal ownership of the property, access control fencing, warning/no trespassing signs placed along the disposal cell boundary, and a locked gate at the entrance to the site. Inspectors found no evidence that these institutional controls were ineffective or violated.

The 205-acre disposal site is owned by the United States of America and was accepted under the U.S. Nuclear Regulatory Commission (NRC) general license (10 CFR 40.27) in 1998. DOE is the licensee and, in accordance with the requirements for UMTRCA Title I sites, is responsible for the custody and long-term care of the site.

### 14.3 Compliance Review

#### 14.3.1 Annual Inspection and Report

The site, located five miles north of Rifle, Colorado, was inspected on August 9, 2007. Results of the inspection are described below. Features and photograph locations (PLs) mentioned in this

report are shown on Figure 14–1. Numbers in the left margin of this report refer to items summarized in the Executive Summary table.

#### 14.3.1.1 Specific Site Surveillance Features

**Access Road, Gates, Fence, and Signs**—The site is accessed by driving northwest of Rifle, Colorado, for 5 miles on State Highway 13 and turning northeast on an improved gravel road. A perpetual right-of-way across BLM property provides access to the site. Two locked gates are installed on the access road. The access road and gates were in good condition.

14A The barbed-wire perimeter fence that limits access to the site proper was in good condition. The barbed wire fence was broken or loose in a couple of places and repaired in 2007. The fence extends to the edge of steep-sided arroyos that bound the site on the east and west to prevent cattle from entering and grazing near the cell. Considerable evidence of elk and deer grazing in the revegetated areas adjacent to and inside the disposal cell site boundary were noted; however, no indication of cattle or sheep grazing inside the site boundary was observed. No evidence of trespassing was noted.

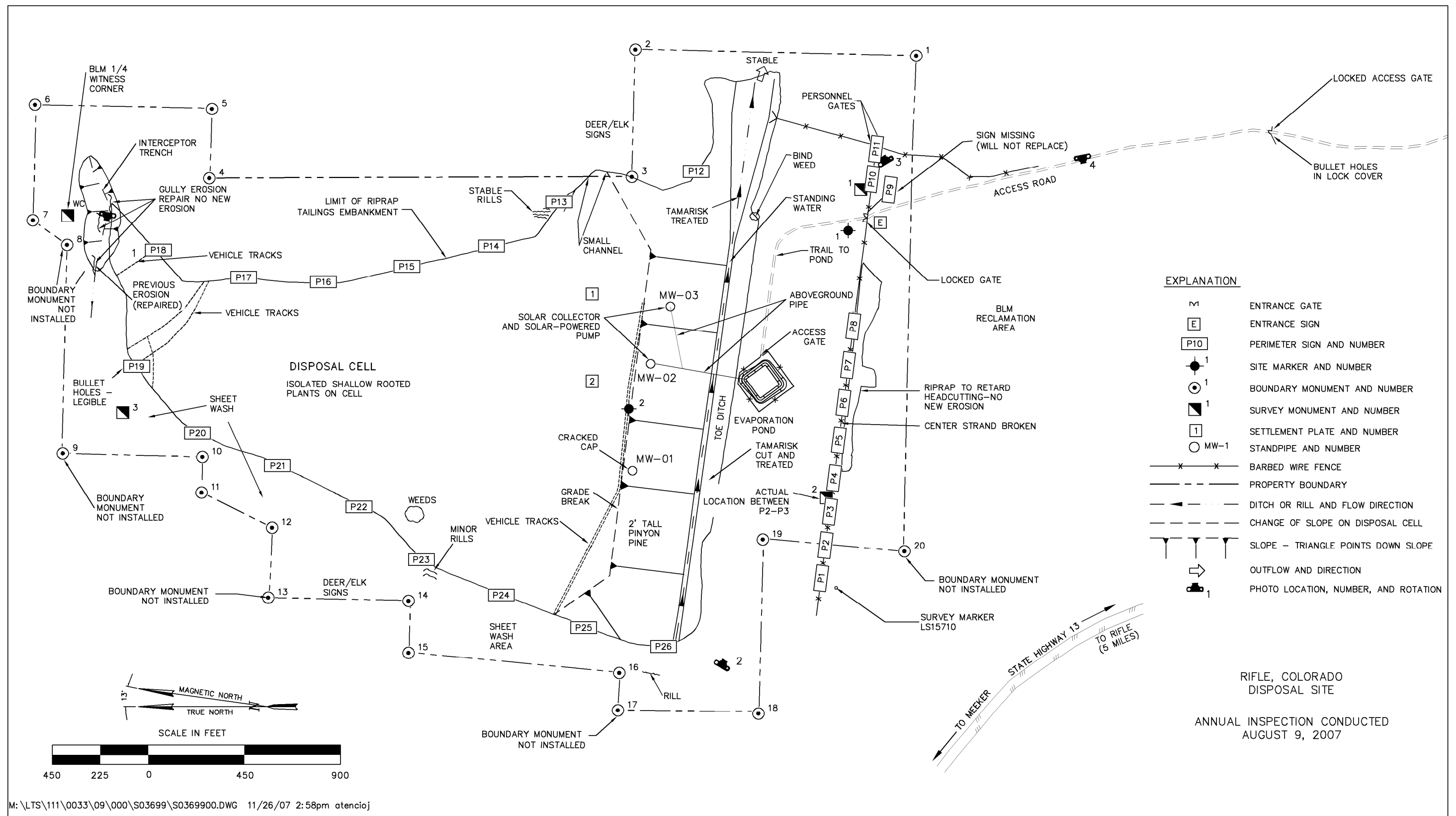
One entrance sign and twenty-six perimeter signs were placed at the site. Perimeter sign P9 that was located just east of the entrance sign, is missing and will not be replaced. All remaining signs are legible and in good condition.

**Markers and Monuments**—Two granite site markers, one just inside and left of the entrance gate and the other on the disposal cell, were undisturbed and in good condition.

There are three survey monuments and 15 boundary monuments at this site. Boundary monuments are set at corners along an irregular site boundary. According to the LTSP, 20 corner monuments were set along the site boundary; however, previous field investigations indicated that only 15 monuments were actually set because of the rough terrain. Consequently, boundary monument locations BM–8, BM–9, BM–13, BM–17, and BM–20 were only marked with wooden lath, and are not included as part of the annual inspection. Several of the survey and boundary monuments at this site are difficult to locate because downfall and underbrush obscure them, or rough terrain makes them inaccessible. All survey and boundary monuments inspected were in good condition.

**Standpipes**—Three standpipes, MW–01, MW–02, and MW–03, are located on the south sideslope of the disposal cell and in good condition. Dataloggers with remote data transfer systems (i.e.; telemetry) are installed in MW–02 and MW–03 to measure water level fluctuations. These two standpipes have solar-powered pumps that discharge water to a lined evaporation pond directly south of the cell. There is no datalogger or pump in MW–01 because it is too shallow to intercept water that accumulates at the base of the cell, and usually is dry. Water level data collected from these two standpipes are presented below in Section 14.3.5.

**Evaporation Pond**—An evaporation pond was constructed adjacent to the cell in 2001 to receive water pumped from standpipes MW–02 and MW–03. A datalogger, also with a remote data transfer system, measures water level fluctuations in the evaporation pond. The lined pond, surrounding security fence, and locked gate were in excellent condition.



### 14.3.1.2 Transects

To ensure a thorough and efficient inspection, the site was divided into four areas referred to as transects: (1) the top of the disposal cell and interceptor trench; (2) the toe ditch and toe ditch outlet; (3) onsite reclaimed areas; and (4) the outlying area.

The area inside each transect was inspected by walking a series of traverses. Within each transect, inspectors examined specific site surveillance features, drainage structures, vegetation, and other features. Inspectors also looked for evidence of settlement, erosion, or other modifying processes that might affect site integrity or the long-term performance of the site.

**Disposal Cell and Interceptor Trench**— Rock armor covers the 71-acre disposal cell and is in excellent condition. No evidence of subsidence, differential settling, or slumping was found.

14B In 2005, it was noted that standpipes MW-02 and MW-03 were not vertical and were tilting slightly downhill. Therefore, surveys of the standpipe inclinations and lateral locations were begun in December 2005. In addition, surveys were conducted for nine settlement plates that were installed on the surface of the disposal cell during construction (prior survey performed in 1997). Results of surveys in 2005 and 2006 indicate that the stickup sections of the standpipes (about 36 inches) are inclined up to 5 degrees downhill. No record of the original inclination of the standpipes was found, and it is presumed that they were vertical when installed. Neither standpipes nor settlement plates have moved laterally since they were installed in 1996; minor settling of the settlement plates (up to 0.46 ft) was indicated. This amount of settlement is not unexpected, and the lack of lateral movement suggests that the pile has been stable for the past 10 years. Survey of these features will be continued annually for the next several years.

A revegetated interceptor trench was constructed at the top of the disposal cell to protect the cell from storm-water and snowmelt run-on. The trench diverts water to the arroyo west of the site. Significant erosion occurred during a major rain event in 2005 and repairs to the interceptor trench were performed. Rocks were moved into the eroded channel and the erosion was stabilized. The area had no new erosion at the time of the 2007 inspection (PL-1). Monitoring of this trench will continue.

**Toe Ditch and Toe Ditch Outlet**—A toe ditch runs along the downslope (south) edge of the disposal cell and is armored with the same rock that protects the disposal cell. The toe ditch diverts surface runoff from the disposal cell off site to the east.

Minor erosion, anticipated in the design, has occurred in the toe drain channel outlet. Bedrock is now exposed, and along with rock placed in the outlet that is dropping into the eroded area (self-armoring), will stabilize the erosion. No new erosion was observed in the channel outlet below the toe ditch. Monitoring of this area will continue.

**Onsite Reclaimed Areas**—Disturbed areas around the edges and south of the disposal cell were reseeded in 1996. The vegetation, primarily grasses, continues to be stressed due to several years of local drought conditions. No evidence of cattle grazing within the site boundaries during the past year was observed. There were no noxious weeds found on the site during the inspection.

Three arroyos are present in the reclaimed area south of the disposal cell. A rock apron was placed between the stock fence and the head-cuts in these arroyos to prevent headward migration toward the disposal cell. As erosion has migrated into the rock apron, the rock has self-armored the arroyos and effectively stabilized them from further erosion.

Rills noted during previous inspections in the vicinity of perimeter sign P13 were stable. The small channel scoured along the interface between the riprap and the adjacent reclaimed soil area as a result remains unchanged. This feature is not threatening the integrity of the disposal cell at this time; however, continued observation is warranted.

**Outlying Area**—The area beyond the site for a distance of 0.25 mile was visually inspected for signs of erosion, development, or other disturbance. The primary land use in the area is grazing and wildlife habitat. No activity or development was observed that might affect site integrity or the long-term performance of the disposal cell. The revegetated grasslands south of the cell were especially dry this year (PL-2). Tumbleweeds that accumulated along the southeast portion of the perimeter fence (PL-3) were removed in September 2007.

The revegetated area directly south of the disposal cell on BLM-managed land was inspected. During construction of the cell, DOE was granted a Right-of-Way Reservation Permit by the BLM to use this area for topsoil storage and other purposes. Because this area did not successfully revegetate, it was reseeded in 2000 and again in 2005. At the time of the inspection, annual weeds dominated plant cover throughout the 16-acre area. It was anticipated that the annual weed cover would provide shade and allow desirable perennial species to take hold during the next several years. Unfortunately, 2007 has been a dry year and cover has decreased from 2006 (PL-4). No corrective action is recommended at this time. Inspectors will continue to monitor the revegetated area.

#### **14.3.2 Follow-Up or Contingency Inspections**

DOE will conduct follow-up inspections if (1) a condition is identified during the annual inspection or other site visit that requires a return to the site to evaluate the condition, or (2) DOE is notified by a citizen or outside agency that conditions at the site are substantially changed.

No follow-up or contingency inspections were required in 2007.

#### **14.3.3 Routine Maintenance and Repairs**

In 2007, DOE removed tumbleweeds from the perimeter fence and repaired broken stands of the barbed-wire fences on site.

#### **14.3.4 Groundwater Quality Monitoring**

Monitoring of groundwater quality is not required at this site because groundwater in the uppermost aquifer is of limited use and the disposal cell is geologically isolated from the first usable aquifer by approximately 3,800 feet of low-permeability siltstones, shales, and sandstones.

### 14.3.5 Disposal Cell Pore Water Level Monitoring

14C

DOE monitors pore water levels in the disposal cell at standpipes MW-02 and MW-03 installed at the downgradient end of the cell on the south side slope to ensure that water within the disposal cell does not rise above the design protection feature, which would occur at an elevation of 6,020 feet. Wet tailings were included with the materials disposed within the cell. Tailings material at the toe of the disposal cell was constructed against a berm or earthen embankment at the southern (downslope) end of the cell. Because of concern that transient drainage and surface infiltration might cause a surface expression (i.e.; seep) to develop, a liner was installed that extends part way up on the inside of the embankment to an elevation of 6,020 feet. If water within the disposal cell were to rise above this elevation, it would overflow the liner and saturate the embankment. This condition could weaken the downslope end of the cell sufficiently to allow slumping to occur, and also could cause a contaminated seep to emerge on the south slope of the cell. Therefore, water level monitoring is performed and an action level for pumping when pore water levels reached an elevation of 6,016 feet was established in the LTSP.

At the time the pumps were turned on in spring 2007, the pump in MW-02 was not working. It was decided that it would be left off since water level measurements indicated little water was available from standpipe MW-02 and the pump would be pulled later in the year and replaced if necessary. The pump in MW-03 was operating at an estimated 4 gpm. The pump in MW-02 was evaluated later in the year and found to have mechanical problems. Instead of replacing it with another pump, which would still have little water to pump, it was decided that the pump in MW-03 would be lowered about 9 feet to near the bottom of the well so that it could pump for longer periods of time and produce more water.

Over the course of the year, datalogger information indicates that the water level in MW-03 increased from 6,013 ft to approximately 6,014.5 ft within several days of the shutoff in November 2006 and slowly approached the 6,015.5 ft level over the winter, but never reached the compliance level or 6016 feet (Figure 14-2). Well MW-02 slowly increased from approximately the same level (6014.5 ft) to about 6015 over the winter. As soon as pumping resumed in spring 2007, the water level in MW-02 decreased to about 6014.5 over the summer and fall. Water in MW-03 decreased to about 6015 feet during the same period. When pumps were turned off in late October water levels again began to slowly rise. About 200,000 gallons of water were produced during the 2007 season.

To date, approximately 4.2 million gallons of water have been pumped from the disposal cell. This includes the volume pumped during construction of the disposal cell and the volume pumped since dewatering was initiated again in 2001. The recovery of the water levels in the standpipes to approximately 6,015 feet after pumping is discontinued, and even slower recovery afterward toward the 6,016-foot action level over the next six months, suggests a large reservoir of water remaining in the disposal cell.

DOE intends to remove enough water from the disposal cell to lower water levels in the standpipes to below the 6,014-foot elevation. At that time, pumping will be stopped, and water levels will be monitored to ensure they remain at or below that elevation. If water levels again rise, pumping will resume.

### 14.3.6 Corrective Action

Corrective action is taken to correct out-of-compliance or hazardous conditions that create a potential health and safety problem or that may affect the integrity of the disposal cell or compliance with 40 CFR 192.

The LTSP establishes that corrective action will be taken if the water level in the disposal cell reaches 6,016 feet in elevation. Corrective action was initiated late in 2001 with the installation of the evaporation pond and dewatering of the cell. This action has lowered the water level to an acceptable elevation and prevents water from overtopping the disposal cell liner. Dewatering of the cell continued in 2007 and will continue in 2008.

### 14.3.7 Photographs

*Table 14–2. Photographs Taken at the Rifle, Colorado, Disposal Site*

<b>Photograph Location Number</b>	<b>Azimuth</b>	<b>Description</b>
PL–1	280	Erosion mitigation at the top interceptor trench (no new erosion).
PL–2	120	View of dry revegetated rangeland inside site boundary.
PL–3	60	View of tumbleweeds at personnel gate along southeast side of perimeter fence.
PL–4	260	View to west of dry, 16-acre BLM rangeland that was reseeded in 2005.

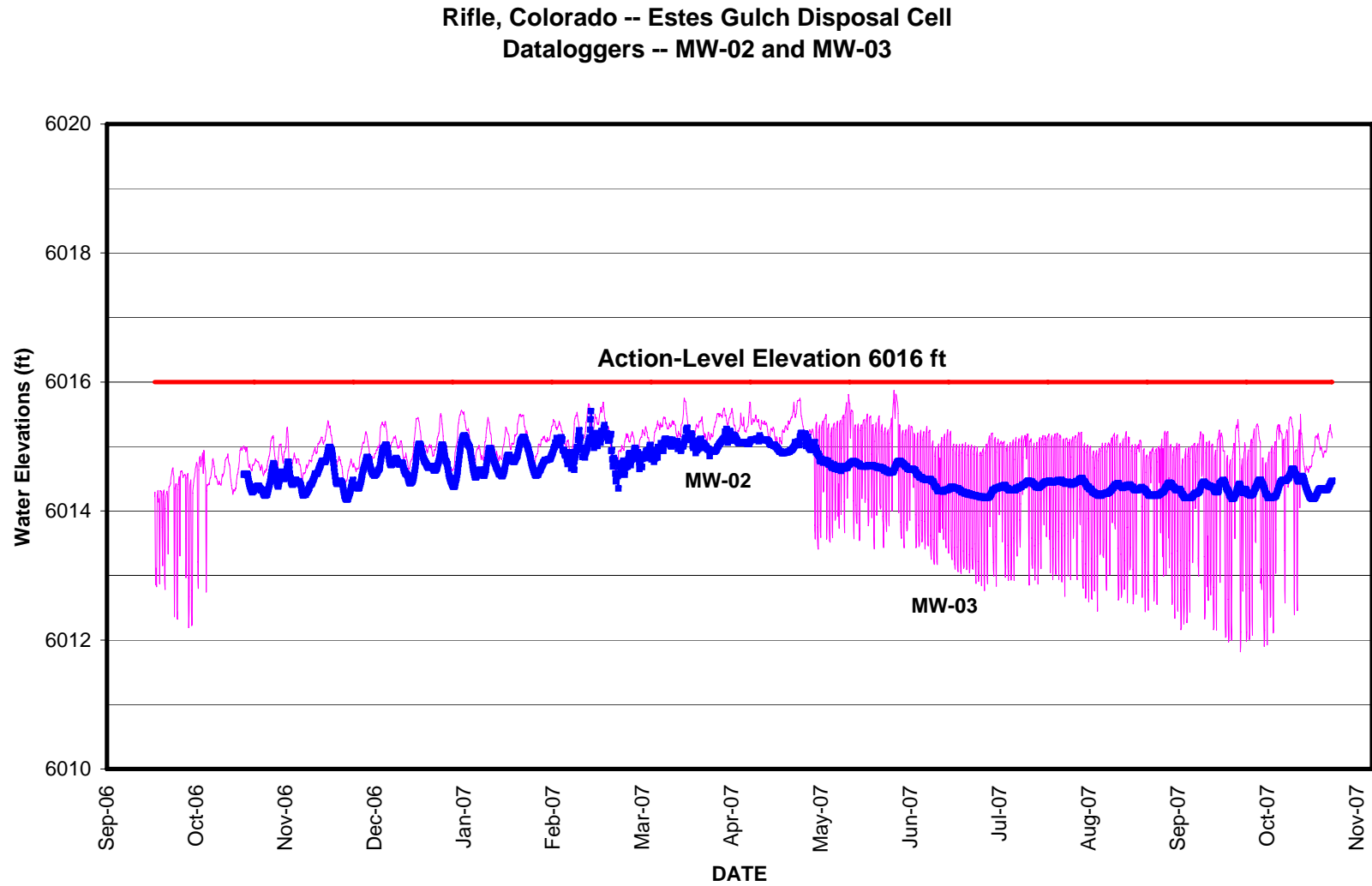


Figure 14–2. Disposal Cell Pore Water Levels in Standpipes MW–02 and MW–03 at the Rifle, Colorado, Disposal Site.





*RFD 9/2007. PL-1. Erosion mitigation at the top interceptor trench (no new erosion).*



*RFD 9/2007. PL-2. View of dry revegetated rangeland inside site boundary.*





*RFD 9/2007. PL-3. View of tumbleweeds at personnel gate along southeast side of perimeter fence.*



*RFD 9/2007. PL-4. View to west of dry, 16-acre BLM rangeland that was reseeded in 2005.*

End of current section.